

GARDNER, CARTON & DOUGLAS

SUITE 3400-QUAKER TOWER

321 NORTH CLARK STREET

WRITER'S DIRECT DIAL NUMBER

CHICAGO, ILLINOIS 60610-4795

(312) 644-3000

TELEX: 25-3628

TELECOPIER: (312) 644-3381

141661

WASHINGTON, D.C.

DENVER, COLORADO

SOUTHFIELD, MICHIGAN

JOHN W. WATSON

(312) 245-8749

December 15, 1989

RECEIVED  
DEC 15 1989

BY MESSENGER

Ms. Cindy Nolan  
Remedial Project Manager (5HS)  
U.S. Environmental Protection Agency  
Region V  
230 South Dearborn  
Chicago, Illinois 60604

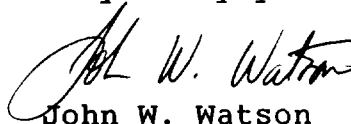
REMEDIAL &  
ENFORCEMENT  
RESPONSE BRANCH

Dear Ms. Nolan:

I write to inform you that the risk-based analysis concerning the construction of the new slip in Waukegan Harbor has not been finalized and will not be submitted to you today as originally contemplated. Geraghty & Miller, OMC's consultant on this project, has completed a final draft of the analysis which was delivered to our office this morning. Unfortunately, Roger Crawford is out of town on business and, therefore, is unable to complete his review of the final draft today.

We are hopeful that we will be able to deliver this analysis to you on Monday. Certainly final review will be completed by the status meeting on Tuesday. Please contact me if you have any questions or comments.

Very truly yours,



John W. Watson

JWW:js

cc: J. Roger Crawford  
Dan Caplice  
Tim Harrington

6809w



January 2, 1990

Mr. J. R. Crawford, Esq.  
Outboard Marine Corporation  
190 Sea-Horse Drive  
Waukegan, IL 60085-2195

RE: Risk Levels for the Proposed New Slip Based on Planned  
Remediation Alternatives

Dear Roger:

This letter reports the results of our assessment of the effects that proposed remedial measures will have on the baseline risk identified for the proposed new slip at the OMC site. The planned remedial measures are as follows: (1) excavation of soils identified as having concentrations above 10 mg/kg cPAHs or 100 mg/kg tPAHs (approximately 8,000 cubic yards of soil); (2) containment of the excavated soils at a secured area; and (3) if analysis of post-construction soils deems necessary, installation of a geotextile membrane and rip-rap along the beached end of the slip.

As discussed in the baseline risk assessment for construction of the proposed new slip, the excess lifetime cancer risks and non-cancer hazard indices (HI) for the reasonable exposure scenario were within acceptable guidelines. However, the worst-case exposure assumptions resulted in an excess lifetime cancer risk level above the acceptable guideline of  $10^{-4}$  for exposure of a boatyard worker and marina visitor. This assessment focuses on the effects that remediation will have on the worst-case risk for these two potential receptors because the other potential exposure pathways are already within acceptable guidelines. The remedial measures will not result in an increase of any exposure levels.

Using the same exposure parameters and equation (Table 1) that was used to calculate the baseline worst-case boatyard worker exposure, the calculated dose for exposure to 10 mg/kg of cPAHs and 100 mg/kg of tPAHs in soils following remediation is  $6.7 \times 10^{-7}$  mg/kg/day for cPAHs and  $9.4 \times 10^{-7}$  mg/kg/day for tPAHs. The worst-case excess lifetime cancer risk and HI are  $7.6 \times 10^{-6}$  and 0.00024, respectively. The worst-case exposure for the boatyard worker following remediation is within acceptable guidelines.

GERAGHTY & MILLER, INC.

Exposure of the marina visitor as estimated in the baseline risk assessment is insignificant following remediation because the geotextile membrane and rip-rap will prevent exposure to the beached sediments. However, assuming that there still exists a potential for marina visitors (primarily children) to play along the beached end and have dermal contact with soils in front of the rip-rapped area, then the calculated worst-case exposure doses are  $6.6 \times 10^{-8}$  mg/kg/day for the cPAHs and  $6.0 \times 10^{-5}$  mg/kg/day for the tPAHs. The excess lifetime cancer risk for exposure of a child marina visitor is  $7.4 \times 10^{-7}$ , and the HI is 0.00015. Risk levels for an adult visitor would be even lower due to the greater body weight. The cancer and non-cancer risks for the worst-case marina visitor exposures are within acceptable guidelines.

Exposure via the other exposure pathways will also be decreased as a result of remediation. The proposed remedial measures will decrease the concentrations of PAHs in the soils at the site thereby decreasing the level of exposure for a utility worker possibly installing the new sewer line. Exposure of an OMC worker or trespasser on the undeveloped OMC property will also be decreased because the excavated soils will be contained rather than spread on the OMC property. Therefore, the remedial measures will also decrease exposure levels for those receptors already identified as having acceptable exposure under existing conditions.

In summation, the proposed remedial measures for the proposed new slip area will reduce PAH concentrations and decrease potential for exposure to the soils. These reductions in concentrations and exposure potential will decrease the worst-case exposure risks. Therefore, the remedial measures will result in acceptable exposure and risk levels associated with the proposed construction of the new slip; and adverse effects to human health will not result even under worst-case assumptions.

Sincerely,  
GERAGHTY & MILLER, INC.,



Frank A. Jones, Ph.D.  
Associate/Toxicologist

cc John Watson, Esq. - Gardner Carton & Douglas  
Peter Romzick - Canonic Environmental

GERAGHTY & MILLER, INC.

Table 1. Exposure Dose and Risk Equations, Outboard Marine Corporation, Waukegan, Illinois.

---

Equation Definition

$$\text{ExD} = \frac{C_{sw} \times (\text{SSA}_{sw} \times \text{WF} \times \text{AF} \times \text{ED} \times \text{UC1} + \text{IRW}) \times \text{EF}}{\text{BW} \times \text{LFT}} +$$

$$\frac{C_s \times (\text{SSA}_s \times \text{DA} \times \text{AF} \times \text{ME} + \text{IRS} \times \text{ME}) \times \text{UC2} \times \text{EF}}{\text{BW} \times \text{LFT}}$$

$$\text{CR} = \text{ExD} \times \text{cpf}$$

$$\text{HR} = \text{ExD} / \text{RfD}$$

where:

AF	Absorption factor-dermal (0.10 PAHs).
BW	Body weight (70-kg adult; 16-kg child).
cpf	Cancer potency factor (assume 11.3 /mg/kg/day for cPAHs).
C <sub>s</sub>	Concentration in soils (mg/kg).
C <sub>sw</sub>	Concentration in surface water (mg/L).
CR	Excess lifetime cancer risk.
DA	Dust adherence (1.45 mg/cm <sup>2</sup> ).
ED	Exposure duration (2 or 8 hrs/day).
EF	Exposure frequency (days/lifetime; assumed to be 25600 days/lifetime for non-carcinogenic effects).
ExD	Exposure Dose (mg/kg-day).
HR	Hazard ratio.
IRS	Ingestion rate - soils (100 or 200 mg/day).
IRW	Ingestion rate - water (0.01 or 0.2 L/day).
LFT	Lifetime (25600 days/lifetime).
ME	Matrix effect - soils (0.15).
RfD	Reference dose (assume 0.4 mg/kg/day for tPAHs).
SSA <sub>s</sub>	Skin surface area exposed to soils (6210 cm <sup>2</sup> for adult; 7000 cm <sup>2</sup> for child).
SSA <sub>sw</sub>	Skin surface area exposed to surface water (560 cm <sup>2</sup> ).
UC1	Unit conversion 1 (10 <sup>-6</sup> L/mg).
UC2	Unit conversion 2 (10 <sup>-6</sup> kg/mg).
WF	Water flux across the skin (0.5 mg/cm <sup>2</sup> -hr).

---